

THE DISCOVERY OF THE EGG OF JERDON'S COURSER *RHINOPTILUS BITORQUATUS* (BLYTH 1848)

ALAN G. KNOX¹ AND STUART B. PIERTNEY²

¹University Museums, King's College, University of Aberdeen, Aberdeen AB24 3SW, UK. Email: a.g.knox@abdn.ac.uk

²Institute of Biological and Environmental Sciences, Zoology Building, University of Aberdeen, Aberdeen AB24 2TZ, UK. Email: s.piertney@abdn.ac.uk

The Jerdon's Courser *Rhinoptilus bitorquatus* (Blyth 1848) was thought to be extinct until it was rediscovered in 1986. The species is poorly known despite a number of studies and, until now, its egg has not been seen by any ornithologist. We report here the discovery of a Jerdon's Courser egg at Aberdeen University in Scotland, the identification of which was confirmed by DNA analysis. The egg was collected by Ernest Gilbert Meaton, a veterinary surgeon at the Kolar Gold Fields in Karnataka (India), probably in 1917, most likely within 100 km of the Gold Fields. Meaton's collection was purchased by George Falconer Rose, given to Aberdeen Grammar School in 1919, and transferred to Aberdeen University in the 1970s. It is hoped the discovery will assist in the conservation of this Critically Endangered species.

Key words: Jerdon's Courser, egg, Karnataka, Aberdeen University

INTRODUCTION

The Jerdon's Courser *Rhinoptilus bitorquatus* (Blyth 1848) is an iconic Indian endemic, formally listed as Critically Endangered, with its presumed current distribution restricted to a small area in the Eastern Ghats of Andhra Pradesh (BirdLife International 2010). The species was recorded only a few times up to 1900 in the Penner river catchment (southern Andhra Pradesh), close to the Godavary river (near Sironcha, Gadchiroli district, Maharashtra, and near Bhadrachalam, Khammam district, northern Andhra Pradesh), and near Anantapur (southern Andhra Pradesh). The early records of the species have often been misquoted and have recently been reviewed by Knox (accepted). Through the early and mid 20th century, the Jerdon's Courser was thought to be extinct (e.g. Fuller 1987), until it was dramatically rediscovered near Cuddapah by Bharat Bhushan in 1986 (Bhushan 1986a, b). Research on the bird since then has been hampered by the species' nocturnal habits, the scrub jungle in which it lives, and its apparent rarity. The Courser is difficult to see and much of the limited recent information has come from the use of tracking strips to detect the footprints of passing birds, automatic camera traps and tape surveys (Jeganathan *et al.* 2002; Jeganathan and Wotton 2004). The species is one of the rarest birds in the world and its future is far from secure (Anon. 2010). Providing adequate protection for the Courser is made harder by the lack of understanding of the species' biology and habits. Although there are anecdotal accounts of eggs (Baker 1929; Baker and Inglis 1930; Samant and Elangovan 1997), none had been seen by an ornithologist until now. We report here the discovery of the first, and so far only known, authenticated record of the egg of the species.

The discovery of the egg of Jerdon's Courser

The Museums at the University of Aberdeen hold the sixth largest collections in Scotland, including the only significant international zoological collection in the north of Scotland (www.abdn.ac.uk/museums). In 2008, AGK visited one of the storerooms of the Zoology Museum and was browsing several drawers of uncatalogued birds' eggs when he noticed one labelled 'Jerdon's Courser', with a note 'Egg unknown to Br India Fauna'. In view of the bird's near-mythical status and global rarity, a check of the literature confirmed that the egg of this species was not just unknown to Blanford (1898) and Baker (1929), compilers of the two editions of *THE FAUNA OF BRITISH INDIA ... BIRDS*, the egg had apparently never been seen by any ornithologist, and there were no eggs known in any museums.

Without measurements, description or photographs with which to compare the egg, the question arose as to whether it had been correctly identified, and if it had, where had it come from?

Identification

From the outset, the shape and size of the putative Jerdon's Courser egg (Fig. 1) was found closely to match that of the African Bronze-winged Courser *R. chalcopertus* in Oates (1902), and the markings, though less dense, showed notable similarities to it. *R. chalcopertus* is a sister species to Jerdon's Courser (Maclean 1996). The dimensions of the egg closely matched those of *R. chalcopertus* as given in Schönwetter (1963). The egg was initially compared to those of other species of coursers of the genera *Cursorius* and *Rhinoptilus*, pratincoles *Glareola*, and possible confusion species breeding in India, such as the lapwings *Vanellus*, using



Fig. 1: The only known egg of Jerdon's Courser *Rhinoptilus bitorquatus*, collected by E.G. Meaton, probably in 1917 and most likely within 100 km of the Kolar Gold Fields, Karnataka, India (University of Aberdeen ABDUZ: 70169).

Length 35.5 mm x 26.5 mm. Photographs: Kim Downie, University of Aberdeen

Aberdeen University's egg collection, as well as published and online resources. Douglas Russell of the Natural History Museum, Tring, provided photographs of the eggs of the other three *Rhinoptilus* species. When these failed to suggest an obvious mis-identification, and supported similarities to *chalcopterus*, the egg was taken to the Natural History Museum for direct comparison with more courser eggs and a wider range of species. Here, a thorough search of the collections and comparisons with possible confusion species again confirmed that the egg, while different, was closest to those of *chalcopterus* in shape, size, colouring, and surface texture. There remained little doubt at this stage that the egg had been correctly identified, a point supported by the credibility of the evidence from the other eggs of the collection in which it has been found, which had, by now, been catalogued.

DNA-based identification

Recent advances in so-called 'DNA barcoding' allow any sample of unknown species provenance to be identified by comparing specific parts of its DNA base sequence with databases of reference sequences populated by recognised taxonomic authorities. Chilton and Sorensen (2007), and Lee and Prys-Jones (2008) recently demonstrated the ability to obtain useful DNA from museum egg shells. As such, we used DNA barcoding to examine the identity of the putative courser egg. The hole through which the egg had been blown had been carefully covered with a gummed paper disc. This was soaked in distilled water and alcohol, and removed with some difficulty. The hole underneath had been neatly drilled without any significant flaps of membrane showing. The inside of the shell was gently scraped with a clean needle, and the contents shaken out and collected. In parallel, a sample from a toe-pad from a Jerdon's Courser skin held in the Natural History Museum was obtained for comparison (NHMUK 96.7.1.51). DNA was extracted from both egg

membrane and toe-pad using a DNeasy DNA extraction kit, according to the manufacturer's protocol, and a polymerase chain reaction (PCR) undertaken according to Piertney *et al.* (2003) to amplify the mitochondrial 16S ribosomal RNA gene using standard avian barcoding primers. PCR products were cloned into a pGEM *E. coli* vector and three amplicon-containing colonies for each sample DNA were sequenced using a 3730 automated DNA sequencer. DNA sequence quality was confirmed by eye from electropherograms, and sequences interrogated using BLAST analysis to confirm 16S identity. The sequences obtained from the egg and the toe-pad were identical, indicating that they had come from the same species, and most similar to *Rhinoptilus africanus* 16S (accession DQ673612.1), the only *Rhinoptilus* 16S sequence on Genbank. As such, it can be concluded that the egg is from a Jerdon's Courser.

Description of the egg of Jerdon's Courser

The egg is short oval in shape (Harrison 1975: 35; Fig. 1), now catalogued as ABDUZ: 70169. It has a non-glossy surface texture, apart from patches apparently covered with surplus from the adhesive used on the gummed paper disc, which had been placed over the blowhole, including partial fingerprints in the adhesive. The egg measures 35.5 mm x 26.5 mm, and weighs 0.76 gm. This compares to averages of 35.5 mm x 26.9 mm for nominate *chalcopterus* and 36.2 mm x 27.0 mm and 0.86 gm for *R.c. albofasciatus* (Schönwetter 1963), a subspecies of *R. chalcopterus* with a similar body-length (Maclean 1996).

The ground colour is an even, pale sandy yellowish, on which are laid brown blotches, compact or elongated in form, occasionally scrawly, and varying in intensity from very dark, almost black, to faint and close to the background colour. Some of the paler markings take on a pale bluish tone. The markings are most intense at the blunt end of the shell; the ground colour is almost completely obscured over an area at

the apex about 12 mm in diameter. There are many fewer markings at the widest point of the egg and the pointed end is almost unmarked. The colours and texture closely match those seen in *chalcopertus* eggs, though the latter show considerably heavier markings, more evenly distributed across the shell.

DISCUSSION

The egg is part of a small collection assembled by Ernest Gilbert Meaton, a veterinary surgeon at the Kolar Gold Fields, Karnataka. The collection was purchased by George Falconer Rose, later a Managing Director of Andrew Yule & Co, Calcutta (= Kolkata), and presented to Aberdeen Grammar School, in Aberdeen, Scotland, early in 1919. The collection remained at the school until about 1978, when it was transferred to the Zoology Museum of the University of Aberdeen. A detailed discussion of the provenance of the Meaton collection is given by Knox (accepted). The egg does not carry a date or place of collection, but limited evidence from the other eggs in the collection suggest it was most likely collected in 1917, and probably within about 100 km of the Kolar Gold Fields (Knox accepted).

Samant and Elangovan (1997) included information on nests and eggs of Jerdon's Courser as reported to them by shikaris. Their description of the eggs – 'yellowish with many black blotches; similar to the Red-wattled Lapwing's *Vanellus indicus* eggs, but a little smaller' – closely matches the verified egg described here and enhances confidence in their observations of nests and nesting. Although it is likely that the eggs of Jerdon's Courser will show some variation, knowledge of what a confirmed egg of the species looks like

should assist field workers to identify others that they might find. The Kolar Gold Fields are about 200 km SSW from where the birds were rediscovered in 1986, and only 50 km SSW from a recent unconfirmed sighting (Fig. 2 in Anon. 2010). It is possible that Meaton may have collected his egg even closer to the Gold Fields than this, and searches of suitable habitat may be warranted.

ACKNOWLEDGEMENTS

Samples of Courser toe-pad were supplied by Mark Adams at the Natural History Museum, Tring. Douglas Russell and Michael Walters put their expertise with egg collections at our disposal. Bharat Bhushan, Panchapakesan Jeganathan, and Rhys Green generously shared their knowledge of Jerdon's Courser with us. The families of E.G. Meaton and G.F. Rose provided much background information; we would like to thank Chris Bateman, Tina Cotton, Carianne Meaton, Sue Norris, Lorraine and Richard Pull, Cynthia and David Reeks, Helen Rodda, and Sian Summers in particular. David Parkin and Nick Picozzi provided comments on a draft of this paper.

For their help in many ways, we are grateful to Kirsteen Campbell, Neil Curtis, Indraneil Das, Kaushik Deuti, Jenny Downes, Kim Downie, Shona Elliot, June Ellner, Michelle Gait, Martyn Gorman, Alison Harding, Melia Knecht, Keith Mackay, Les Noble, Robert Prys-Jones, Pamela Rasmussen, Sarah Redmond, Asad R. Rahmani, George Sangster, Helen Stevenson, K.A. Subramanian, Lisa van Bijl, Sophie Wilcox, Michael Wilson, Margot Wright, and anyone we may inadvertently have failed to mention.

REFERENCES

- ANON. (2010): A Species Recovery Plan for Jerdon's Courser *Rhinoptilus bitorquatus*. Andhra Pradesh Forest Department, Government of Andhra Pradesh, Hyderabad. 30 pp.
- BAKER, E.C.S. (1929): The Fauna of British India, including Ceylon and Burma. Birds. 2nd edn. Vol. VI. Taylor & Francis, London.
- BAKER, H.R. & C.M. INGLIS (1930): The Birds of Southern India, including Madras, Malabar, Travancore, Cochin, Coorg and Mysore. Madras.
- BHUSHAN, B. (1986a): Rediscovery of the Jerdon's or Double-banded Courser *Cursorius bitorquatus* (Blyth). *J. Bombay Nat. Hist. Soc.* 83(1): 1–14.
- BHUSHAN, B. (1986b): Rediscovery of Jerdon's or Double-banded Courser. *Hornbill* 1(1) 1986: 3–8.
- BIRDLIFE INTERNATIONAL (2010): *Rhinoptilus bitorquatus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. www.iucnredlist.org, accessed 02 April 2012.
- BLANFORD, W.T. (1898): The Fauna of British India, including Ceylon and Burma. Birds. Vol. IV. Taylor & Francis, London.
- CHILTON, G. & M.D. SORESENSEN (2007): Genetic identification of eggs purportedly from the extinct Labrador Duck (*Camptorhynchus labradorius*). *Auk* 124: 962–968.
- FULLER, E. (1987): Extinct Birds. Viking/Rainbird, London.
- HARRISON, C. (1975): A Field Guide to the Nests, Eggs and Nestlings of European Birds. Collins, London.
- JEGANATHAN, P. & S.R. WOTTON (2004): The first recordings of call of the Jerdon's Courser *Rhinoptilus bitorquatus*. *J. Bombay Nat. Hist. Soc.* 101(1): 26–28.
- JEGANATHAN, P., R.E. GREEN, C.G.R. BOWDEN, K. NORRIS, D. PAIN & A.R. RAHMANI (2002): Use of tracking strips and automatic cameras for detecting critically endangered Jerdon's Coursers *Rhinoptilus bitorquatus* in scrub jungle in Andhra Pradesh. *Oryx* 36: 182–188.
- KNOX, A.G. (accepted): The first egg of Jerdon's Courser *Rhinoptilus bitorquatus* and a review of the early records of this species. *Archives of Natural History*.
- LEE, P.L.M. & R.P. PRYS-JONES (2008): Extracting DNA from museum bird eggs, and whole genome amplification of archive DNA. *Molecular Ecology Resources* 8: 551–560.
- MACLEAN, G.L. (1996): Family Glaucopidae. Pp. 364–383. In: del Hoyo, J., A. Elliott and J. Sargatal (Eds): Handbook of the Birds of the

DISCOVERY OF THE EGG OF JERDON'S COURSER

- World. Vol. 3. Lynx Edicions, Barcelona.
- OATES, E.W. (1902): Catalogue of the Collection of Birds' Eggs in the British Museum (Natural History). Vol. II. British Museum (Natural History), London.
- PIERTNEY, S.B., C. HUDELLOT, F.G. HOCHBERG & M.A. COLLINS (2003): Phylogenetic relationships among cirrate octopods (Mollusca: Cephalopoda) resolved using mitochondrial 16S ribosomal DNA sequences. *Molecular Phylogenetics and Evolution* 27: 348-353.
- SAMANT, J.S. & V. ELANGO VAN (1997): Avifauna of the Eastern Ghats with special reference to the Jerdon's Courser *Cursorius bitorquatus*. Final Report. Bombay Natural History Society, Bombay.
- SCHONWETTER, M. (1963): *Handbuch der Oologie*. In: Meise, W. (Ed.): Volume 1, Lieferung 7. Akademie-Verlag, Berlin.

